REPORT

OF THE REGIONAL MEETING ON CHOLERA AND DIARRHOEAL DISEASES

Alexandria, 1 - 5 June 1978

WORLD HEALTH ORGANIZATION
EASTERN MEDITERRANEAN REGION

WORLD HEALTH ORGANIZATION

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TABLE OF CONTENTS

I OPENING OF THE MEETING

The Regional Meeting on Cholera and Diarrhoeal Diseases was opened under the chairmanship of Dr M.O. Shoib, Director, Programme Management, on behalf of Dr A.H. Taba, WHO Director, EMR.

The problem of cholera and diarrhoeal diseases in general has been assuming greater importance in the last few years because of the persistence of these infections and the difficulties encountered in their control.

In this Region, the problem, particularly its international aspects, was discussed last September in the Meeting of the Directors of Preventive Medicine of the Arab countries. This was again discussed in October 1977 during the 27th Session of the Regional Committee in Kuwait and recommendations were made concerning the measures to be taken to prevent the spread of cholera through international boundaries, and the Regional Office was given a specific mandate to assist Member States of the Region in the formulation of a unified health policy to curb the present cholera outbreaks and to prevent further episodes.

On the global scene, the Thirty-first World Health Assembly in May 1978 passed a resolution urging Member States to identify diarrhoeal diseases as a major priority area for action and to apply known effective measures for the management and control of diarrhoeal diseases in the primary care context. The Assembly also requested the Director-General to promote technical co-operation among Member States in the formulation, implementation and evaluation of the programme and in the training of workers at different levels, and called upon other international organizations such as UNDP, IBRD and UNFPA, to support the programme as already done by UNICEF.

The Governments of the United Kingdom and Kuwait have already contributed financially to the effort and it is expected that other Governments will follow suit and provide further support to allow the programme to expand.

The problem of diarrhoeal diseases requires a multi-disciplinary approach and authorities other than health are to be involved. There is therefore a need to disseminate knowledge to other related sectors of the Governments and particularly to those responsible for overall socio-economic planning and development so that due priority is accorded to the related areas of water supply and environmental sanitation.

The countries of the Region, aware of the priority of the problem, are placing on the experts the important task of defining the problem and of planning and coordinating a unified policy of control.

II NOMINATION OF OFFICERS

Dr A.M. El Akkad, Under-Secretary of State for the Preventive Sector, Ministry of Health, Cairo, Egypt; Dr S. Ourshano, Department of Malaria Eradication and Communicable Diseases Control, Ministry of Health and Welfare, Teheran, Iran; Dr S. Al Subaihi, Director of Preventive Medicine, Ministry of Health, Amman, Jordan; Dr S. Bokhari, Professor of Bacteriology, Bacteriologist, Punjab Government, Institute of Hygiene and Preventive Medicine, Lahore, Pakistan; and Dr H.S. El Dabbagh, Director-General of Preventive Medicine, Ministry of Public Health, Riyad, Saudi Arabia, were nominated as alternate daily Chairmen for the five days of the Meeting; Dr Bokhari was nominated Rapporteur to be assisted by the Secretariat.

III ADOPTION OF THE AGENDA

The Agenda was unanimously adopted.

IV REVIEW OF THE PROBLEM OF DIARRHOEAL DISEASES IN THE REGION

No doubt diarrhoeal diseases represent a highly important problem in the Eastern Mediterranean Region. This fact is also evidenced by the interest shown by all national health authorities and international health organizations as well as bilateral and non-governmental organizations involved in health work. This Meeting, which followed the Meeting of the International Epidemiological Association (IEA) held a few days earlier in Alexandria, is a case in point. The Meeting of the Directors of Preventive Medicine of the Arab countries (September 1977) and the Technical Session held during the Twenty-Seventh Session of the Regional Committee for the Eastern Mediterranean in Kuwait (October 1977), initiated close regional collaboration in this important field which is now being followed up with due emphasis on the overall comprehensive problem of diarrhoeal diseases.

In the past, cholera received most of the attention amongst this group of diseases but our present knowledge indicates that we have now effective tools to control the spread of cholera epidemics and limit its mortality to less than 1 per cent. On the other hand, other diarrhoeal diseases, particularly those of infancy and childhood cause a higher mortality and morbidity and deserve greater attention. As an example, infantile gastroenteritis, shigella and enteric fevers come higher in the list than cholera as causes of mortality and morbidity. Although these diseases can be controlled, very few countries have developed an effective and comprehensive control programme against diarrhoeal diseases.

Diarrhoeal diseases are prevalent mostly throughout the year, in urban as well as in rural areas of our Region, with some seasonal variations. They affect all age groups, males and females, although the burden falls particularly on infants and children, the sick and the aged.

Out of eleven million children born each year in this Region, one and a half million die before the age of one year and a further half million between one and five years.

A rough analysis of available data shows that diarrhoeal diseases are the cause of 30 - 45 per cent of the total deaths under five years of age; this amounts to 600 000 - 900 000 deaths every year. Diarrhoeal diseases are the number one cause of death in this age group; they also cause 15 - 20 per cent of the deaths in all age groups.

Agents of major importance are bacteria such as *Salmonellae* including *S. typhi*, *snigellae*, *Escherichia coli*, *Vibrio cholerae*, *staphylococci* and *Clostridium perfringens*; viruses such as enteroviruses of the rotavirus and parvovirus groups and parasites such as amoebae and giardia.

The chain of transmission in diarrhoeal diseases is faecal-oral contamination involving primarily excreta, water, foods, hands, and secondarily, soil, insects and fomites. This chain has to be broken in order to control any of the diarrhoeal diseases. New cases, chronic cases and carriers maintain the chain of transmission.

It is rather disappointing to note from the World Health Statistics Report that there has been particularly no increase in the percentage of urban populations served by safe water supply between 1970 and 1975 in the Region. Fifty-two per cent of the urban population in the Region (68 million) had access to piped water supply through

house connections. The percentage increases to 80 per cent if services through water standposts are included. In rural areas only 16 per cent had access to safe water in 1975 (30 million).

The same can be said in respect of excreta disposal; no increase in populations covered from 1970 to 1975. Only sixty-three per cent of the urban and 14 per cent of the rural populations have such facilities.

Food hygiene and personal hygiene are generally poor in most countries of the Region. This is determined by socio-economic standards. Here, education and organized community efforts are known to yield positive results.

A collaborative effort among different Member States of the Region involving the following broad areas should be made:

- formulating a regional plan to prevent the spread of cholera by breaking the chain of enteric disease transmission
- promoting the establishment of epidemiological surveillance at country and regional levels
- promoting the development of laboratory facilities using standardized techniques
- promoting the use of oral rehydration
- the organization of emergency services in case of epidemics.

The implementation of such a programme will require additional funds for overall general support. This is necessary to cover the costs of short-term consultants, some essential supplies and equipment as well as fellowships, training courses, meetings, seminars as well as research, under the three principal programmes shown below.

A rough estimate and breakdown of the annual costs for the period 1978 - 1981 is:

Support to Services	$ 195 000
Training	85 000
Research	70 000
TOTAL	$ 350 000

Costs at country level cannot be estimated at present as they depend on the size of the problem and the status of development of health services in each country; however they would be much more substantial.

It is therefore essential for the success of such an important programme that effective collaboration be achieved between countries of the Region in covering its costs through voluntary contributions. Other potential sources of support are the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP), the International Bank for Reconstruction and Development (IBRD), and the United Nations Fund for Population Activities (UNFPA).

V REVIEW OF THE PROBLEM OF THE PRESENT SITUATION IN MEMBER COUNTRIES

1. Egypt

Diarrhoeal diseases in Egypt represent a serious public health problem. They form the most common cause of death in children under three years of age, as shown in the following tables:

Percentage distribution of major causes of death in infants (1973)

Gastroenteritis	43%
Communicable diseases, mainly respiratory	30%
Prematurity	11%
Congenital malformations	3%
Other causes	13%
	100%

Even in the total population, diseases of the digestive system represent a high percentage of major causes of death in Egypt:

Diseases of digestive system	30%
Senility and ill-defined causes	20.60%
Diseases of respiratory system	18.67%
Diseases of circulatory system	12.37%
Other causes	18.31%
	100%

Morbidity and endemicity of acute diarrhoeal diseases in Egypt

Epidemiological studies prove that, in general, there are four at acks of acute diarrhoea per child per year during the period from 6 to 36 months of age.

The following are the disposing factors closely associated with the occurrence of acute diarrhoeal diseases in Egypt:

- Poor sanitation
- Malnutrition
- Unhygienic habits and early bottle-feeding
- Infectious diseases

Prevention and control

The following measures are being adopted:

(a) Environmental sanitation
- water supply
- food control legislation
- sanitary sewage disposal

(b) Nutrition
- nutritional surveillance
- nutritional education

(c) Compulsory vaccination programme

(d) Oral rehydration programme

(e) Network of basic health units.

Prevention and control of cholera

The following measures are adopted:

(a) Environmental sanitation

(b) Training of staff for surveillance

(c) Laboratory facilities

(d) Vaccination against cholera applied as mass vaccination before outbreaks

(e) Health education

(f) Mass chemotherapy for contacts, carriers and people from endemic areas

2. Iran

Diarrhoeal diseases constitute the second most prevalent diseases in the country. In 1973, a situation analysis showed that the incidence of diarrhoea was 22.2 per cent in the 0 - 5 years age group and 14 per cent in all age groups.

To prevent diarrhoeal diseases including cholera, the Ministry of Health and Welfare has two programmes:

(a) long-term programme and

(b) short-term programme

(a) Long-term programme

- to supply safe water to all rural areas
- waste disposal system
- health education
- covering all the country by health facilities network

(b) Short-term programme

- early diagnosis of cholera by establishment of laboratories in all provinces supported by a reference laboratory in the capital.
- notification of cases
- isolation of cases and treatment
- chemoprophylaxis only for close contacts.

Mass vaccination is not done anywhere, but vaccination is still given to those who demand it.

The final solution to control diseases, especially diarrhoeal diseases in rural areas, will be achieved through coverage of the country by the network of health nouses and by using oral rehydration salts (ORS) at rural level by the auxiliary health workers, which will reduce the cases of diarrhoea requiring hospitalization.

3. Jordan

Enteritis, typhoid fever, dysentery and infectious hepatitis are prevalent in Jordan. The Ministry of Health's policy regarding cholera is as follows:

- No mass vaccination is done.
- Chemoprophylaxis is restricted to close contacts.
- No international certificate of vaccination against cholera is required from arrivals from infected countries.
- No restriction is made on food importation from infected countries except on unpasteurized and uncanned milk, milk products and fish.

- Pilgrims arriving from infected countries, on their way to Saudi Arabia, are not allowed to enter the cities or camp near water supplies.
- Early and correct notification to WHO and all neighbouring countries.

Two cholera epidemics had occurred recently, i.e. in 1976 with 152 cases and in 1977 with 427 cases and one death only. The ratio of carriers to cases was 1 : 1. The two epidemics were due to *Vibrio cholerae* biotype El Tor, serotype Ogawa.

4. Saudi Arabia

The enteric communicable diseases encountered in Saudi Arabia are caused by *E.coli*, salmonella, shigella, staphylococci, enteroviruses and *Ent. histolytica*.

During the last five years, there were three localized outbreaks due to cholera:

(a) December 1974 - February 1975 in the Western Region: 1 159 cases with 126 deaths
(b) 1976 in Hofuf: 163 cases with one death
(c) 1977 in Kaiber, Medina: 86 cases with no deaths.

Strict control measures are taken during the Haj pilgrimage such as:

- sanitary measures:
  - safe water supply
  - food control
  - excreta disposal
  - fly control
- health education with detailed coverage of the following aspects:
  - how to preserve food
  - how to prevent hyperpyrexia and heat exhaustion
  - personal hygiene and cleanliness
- availability of medical services such as rehydration centres
- quarantine
- continuous surveillance

There is close co-operation between various Ministries in the form of a Board of Environmental Health for the control and guidance of all the Haj requirements.

5. Pakistan

(a) Causes of diarrhoeal diseases

The identified causes of diarrhoeal diseases and gastroenteritis in adults are the following:

- Various species of shigella. These in order of prevalence are: *Shigella flexneri, Shigella shigae, Shigella boydi* and *Shigella sonnei.*
- Enteropathogenic *Staphylococcus pyogenes.*
- Various species of salmonella.
- Enteropathogenic *Escherichia coli.*
- *Vibrio cholerae* in the form of outbreaks which occurred in the years 1958, 1960, 1965, 1967, 1968, 1969, 1970 and 1977.

(b) The causative organisms in infants and children are the following:

- enteropathogenic *Escherichia coli;*
- various species of shigella;
- various species of salmonella;
- enteropathogenic *Staphylococcus pyogenes;*
- *Vibrio cholerae* in the form of epidemics mentioned above.

(c) Incidence of enteric fevers, dysentery and cholera in Pakistan

No national figures are available. A survey based on recall history in Ferozewella and Gajjamatta villages revealed that diarrhoeal diseases contributed to 80 per cent of morbidity and mortality amongst all combined causes. In the years 1974 - 1975 the following was the incidence of diarrhoeal diseases, gastroenteritis and enteric fevers:

- Children 0 - 4 years : 30.3%
- Children above 4 years and adults : 10.2%

(d) Cholera outbreaks

Classic cholera outbreaks occurred in 1947, 1948, 1949, 1960 and 1968. El Tor cholera, serotype Ogawa, outbreaks started in 1964 in Lalyari area in Karachi and spread north along the railroad. They occurred practically every year. The last outbreak occurred in 1977. A possible endemic area is the Lalyari area of Karachi. However, Lahore, Multan, and Sialkot should be investigated for endemicity.

A survey of stools among healthy contacts in Kasur jail during an epidemic outbreak in 1977 indicated that 3.8 per cent of the inmates of the barracks were carriers of *Vibrio cholerae* biotype El Tor serotype Ogawa. It was found during the 1968 epidemic that 25 per cent of the patients were harbouring organisms resistant to tetracycline and that 22 per cent sensitive strains became resistant to tetracycline during treatment.

(e) Factors responsible for persistence of diarrhoeal diseases

These are determined by poor environmental conditions (water supply, sewerage and garbage disposal). Surveillance operations are lacking because of lack of public health laboratories in the provinces.

(f) Future plans

A cholera and diarrhoeal diseases control programme can be instituted under the communicable diseases control programme.

VI POTENTIAL FOR THE CONTROL OF DIARRHOEAL DISEASES WITH VACCINES AND BY CHEMOPROPHYLAXIS

1. Cholera vaccines

Vaccines that are currently available cannot be relied on for the control of cholera. Although moderate levels of protection have been observed in some field trials of cholera vaccines, their effectiveness has not been substantiated in epidemic control. The disparity between results of some field trials and their disappointing applied use is due to several reasons:

(a) there is a wide variation in potency of vaccines produced by different manufacturers and even lot-to-lot variation of vaccines produced by the same manufacturer at different times;
(b) measured levels of vaccine efficacy in field trials are the result of vaccine-induced immunity reinforced by naturally occurring transmission; in epidemic settings this reinforcement is usually minimal and limited;
(c) even vaccines of known high potency provide only 50-60 per cent protection in endemic areas for about 2-4 months;
(d) they do not materially interrupt transmission;
(e) they do not affect the carrier state;
(f) they do not prevent the introduction into a region or country;
(g) they give a false sense of security to those who receive them;
(h) they give a false sense of accomplishment to those who administer them;
(i) there are more effective control measures such as oral-fluid treatment and simple sanitation which are less expensive in the long run;

(j) very often vaccination programmes are performed using the same needle or syringe for several persons which allows transmission of viral hepatitis, a disease much more serious than cholera.

However, if a vaccine of known high potency is available, selective vaccination of high-risk population groups using appropriate techniques may be advisable in special circumstances.

Some experimental vaccines appear to offer some hope in obviating a few of these disadvantages. These experimental vaccines include:

(a) A recently tested aluminium adjuvant bivalent whole-cell vaccine. This vaccine has been found in preliminary trials to protect children in endemic areas in India and Indonesia to a much greater extent than generally available vaccines and to provide about 50% protection in adults for approximately 14 months.

(b) A purified toxoid or a combined toxoid-bacterial vaccine. Because of shared antigenicity between cholera enterotoxin and the heat labile toxin of enterotoxigenic *E.coli*, there is a prospect that a cholera toxoid might protect against both diseases. A preliminary toxoid field trial was disappointing, but another is planned.

(c) Naturally occurring and laboratory mutants of *V. cholerae*. Several strains have been tested but at this time none appears to be imminently promising.

2. Shigella vaccines

Streptomycin- dependent strains of *Shigella flexneri* and *S. sonnei* have been developed, extensively studied and field tested. High levels of type-specific efficacy have been demonstrated in children residing in endemic areas and in members of the armed forces but protection lasted for less than one year. Laboratory reversion of these strains and in one instance reversion in man of a vaccine strain have been reported. These facts and the need for multiple doses seriously limit the possibility of public health application of these vaccines.

Heat-killed oral shigella vaccines have been tested but have not been shown to protect.

3. Rotavirus vaccines

Increasing titres of antibodies against rotavirus with increasing age associated

with decreased susceptibility to the disease suggest the possible usefulness of a rotavirus vaccine. Although rotavirus strains appear to be morphologically similar there may be subtle antigenic differences and this question is being studied as a step towards the development of a vaccine.

4. Chemoprophylaxis

Tetracycline has been shown in clinical field trials in Dacca, Calcutta, and the Philippines to reduce the transmission of *V. cholerae* among close contacts of cases, although in one endemic area the effect was repeatedly shown to last only a day or two longer than the period of treatment. Tetracycline was administered in some of these trials in multiple doses for 3 to 5 days; one large daily dose given for 5 days was less effective. Recently however, doxycycline in only one 300 mg dose was found to be almost as effective as multiple doses of tetracycline given over 3 days.

A long-acting sulpha-drug sulphadoxine (Fanasil) was also found in a field trial in a newly-affected area in Africa to shorten the period of vibrio excretion by close contacts but the appearance of new carriers among them, i.e. transmission, was not looked for. In another trial in Calcutta, sulphadoxine was found as effective as tetracycline in reducing transmission but was slower in action, being less effective during the more important 48 hours.

These new results have led countries to use antimicrobials like tetracycline, chloramphenicol, sulphadoxine and streptomycin in the control of cholera epidemics but their effectiveness has never been properly evaluated. All these drugs have potentially serious side effects, particularly when administered in an unsupervised manner. Tetracycline may cause liver damage and is contra-indicated in pregnant women, small children and in persons with renal disease; sulphadoxine may cause blood dyscrasias and hypersensitivity reactions including Stevens-Johnson syndrome; chloramphenicol may cause aplastic anaemia. All these drugs can promote the development of multiple drug resistance. They may also increase susceptibility to a variety of enteric pathogens including *V. cholerae* by altering the intestinal flora.

A WHO working group discussing this problem concluded that the evidence for the effectiveness and safety of drugs used for preventive medication against cholera is not such that they could recommend any of them for mass application. It has also

been pointed out that, as in a community usually not more than 5 per cent will be infected with *V. cholerae* at any one time and of them less than 5 per cent may go on to develop cholera, it may be necessary to treat about 400 persons to prevent one case. The risk/benefit ratio is thus difficult to justify. Multiple systematic cases of cholera in a family are very rare

This kind of therapy with the appropriate drug may, however, be effective in controlling outbreaks in small, rather isolated and stable communities, e.g. refugee camps, on board ships, etc. Doxycycline and other tetracyclines given in appropriate dosage may be suitable for that purpose.

It is thus difficult to find technical justification for the use of the available bacterial enteric vaccines or chemoprophylaxis in control of cholera and other diarrhoeal diseases, except possibly in a few unusual circumstances.

VII CONTROL OF EPIDEMICS

An epidemic outbreak of cholera is usually a sudden event for which health administration may not be fully prepared.

Emergencies in general require a systematic approach to avoid dispersal of available resources and disruption of essential services. In general, it may be said that a well-organized emergency service should not disturb the other essential health services but operate with efficiency parallel to and in coordination with them.

The essential emergency services in case of epidemics imply the following broad activities:

(1) preparation of a plan of action with assignment of responsibilities at central, provincial and local levels;
(2) provision of medical care facilities;
(3) provision of transport facilities;
(4) epidemiological surveillance including prompt investigation;
(5) monitoring and evaluation.

The methodology for the implementation of the above-mentioned broad activities may vary with the type of emergency encountered and is dealt with in this presentation in relation to the cholera problem.

The first action to be taken on receipt of information that a cholera epidemic has started, or is likely to start, is the nomination of a responsible officer for coordination of all activities connected with the emergency. The responsible officer should be supported by a group of experts in the sectors of Health, Public Works (Water and Sewage), Information, Transport, Communications, Local Administration, Finance and Planning, as may be required by the multidisciplinary nature of the measures to be taken.

1. The plan of action will include the following:

(a) Nomination of responsible officers; designation of reference laboratories; designation of reference hospitals; designation of environmental health control officer.

(b) Assignment of responsibilities at national and provincial levels.

(c) Definition of standard methodologies for; screening of cases, diagnostic criteria, collection of specimens, transport, laboratory examination, reporting and crosschecking, screening and treatment of contacts, treatment of cases including antibiotic schedules and rehydration techniques, transport of patients, disposal of infected material, epidemiological investigation of cases and clusters, including environmental studies, examination of water, sewage, food, etc., techniques and reporting, follow-up of cases and contacts, measures at frontier posts, preventive measures including treatment of water, and health education.

(d) Collaboration and coordination with WHO in the following specific areas: Notification of cases and deaths; agreement on measures affecting international travel and trade; epidemiological study on the dynamics of the epidemic within the country as well as at international level; exchange and dissemination of information; coordination with neighbouring countries; provision of technical expertise and essential supplies and equipment not locally available.

2. Facilities, equipment and supplies

- Hospitals with an adequate number of beds for cholera patients
- Professional and sub-professional staff
- Sufficient quantities of antibiotics for the treatment of cases
- Sufficient quantities of intravenous rehydration fluids of the recommended type exclusively (Ringers' Lactate or 5.4.1)
- Sufficient quantities of oral rehydration salts of the recommended type only.

- Laboratories conveniently distributed so as to cope with the needs of examination of stool specimens, duly equipped for cholera vibrio culture and isolation
- Sufficient quantities of TCBS, Krigler's and peptone media
- Sufficient quantities of specific diagnostic sera.

Training of all responsible staff on:

- Appropriate clinical diagnostic techniques
- Appropriate treatment techniques
- Appropriate rehydration techniques
- Appropriate laboratory techniques.

3. Provision of transport facilities

- Ambulance services to ensure the rapid transport of cases to the nearest treating hospital.
- For supplies and equipment distribution and replenishment
- For epidemiological investigation teams
- For environmental sanitation teams
- For transport and disposal of infected material.

4. Epidemiological services

(a) Establishment of a central epidemiological intelligence unit for:

- Receipt of all notification of new cases of cholera
- Mapping of the geographical spread of the disease
- Identification of areas and population groups under risk
- Study of the returns of epidemiological investigation and identification of sources and causes
- Initiation and implementation of further studies likely to elucidate the dynamics of the epidemic
- Advice on measures to curb the epidemic
- Evaluation of the results of measures taken.

(b) Establishment of regional epidemiological units

Under the direction of the central epidemiological unit:

- Active and passive search for cases and carriers
- Implement investigation of individual cases of cholera and of each cluster

- Collect specimens of stools, water, sewage, food, etc., relevant to the investigation and obtain their examination
- Maintain a map with the distribution of cases and clusters
- Report to the central epidemiological unit
- Evaluate results of control measures taken.

5. Monitoring and Evaluation

The responsible officer in charge of the emergency operations in case of a cholera epidemic, as well as the technical committee, should, through the epidemiological intelligence unit monitor the different aspects of the implementation of the plan of action, evaluate the efficacy of the measures taken, issue the instructions to those concerned for corrective measures when necessary and have the power to change staff or modify instructions according to requirements.

The planning of the monitoring of cholera as a part of the post-epidemic surveillance service in the country is also a part of the duties of the responsible officer and of the supporting technical committee.

Such a plan should be presented in the form of recommendations for activities to be included into the regular surveillance of communicable diseases. In those countries where such a communicable diseases surveillance system does not exist, the nucleus created for the purpose of an emergency should be retained and serve as a basis for the establishment of such services.

VIII SURVEILLANCE FOR CHOLERA PREVENTION AND DETECTION

A. ACTIVITIES RELATED TO EPIDEMIOLOGICAL SERVICE

(i) Surveillance

Passive clinical	- Screening	Clinical laboratory confirmation
Active clinical	- Screening	Clinical laboratory confirmation
Active environmental	- Screening	
	- Water	Public health laboratory confirmation
	- Sewage	Public health laboratory confirmation
	- Food	Public health laboratory confirmation

(ii) Epidemiological study
- Analysis of existing information:
  - mapping of the disease
  - identification of population at risk
- Surveys and specific case studies:
  - identification of pathogens
  - identification of causes or routes of transmission
  - definition of receptivity

(iii) Definition of control measures
- For preventing the spread of infection
  - within the country
  - through international boundaries

(iv) Epidemiological Information System
- to the general public
- international notification
- to the medical profession

B. SURVEILLANCE

Surveillance is a process of continuous monitoring of diseases among the population with total coverage in time and space.

Monitoring implies the following essential requirements:

(a) the ability to diagnose;

(b) the ability to communicate.

The first requirement, diagnosis, can be achieved with precision in the curative institutions, particularly where qualified medical personnel and equipped laboratories exist. Unfortunately, the curative institutions of this type are scarce or non-existent in most of the rural areas.

It is not necessary to emphasize the need for a minimum of service at the most peripheral level in a complete network of primary health care, but, can such a system ensure the "diagnosis" at primary level?

The non-professional health worker needs some tools to satisfy the diagnostic requirement. These are:

(a) the existence for each disease of reliable screening criteria;

(b) the possibility of rapid verification through simple laboratory tests.

The simple "primary" screening performed by the primary health worker would lead to a more precise diagnosis by laboratory testing of the specimen collected by him, using simple and safe techniques.

The primary screening would be followed by a more precise diagnosis through simplified laboratory techniques.

In the case of cholera it is obvious that at primary screening level, it would not be possible to diagnose the initial cases of cholera occurring without laboratory support. In practice, the primary screening for cholera should be based on regular collection of stool specimens from any case of diarrhoea occurring among adults.

The methodology of investigation includes:

(a) Identification of the enteropathogenic agent;

(b) Identification of the most probable route of infection;

(c) Determination of the intensity of the faecal-oral cycle of infection;

(d) Identification of the corrigible or breakable bonds of the chain of transmission;

(e) Definition of the methodology of control.

The second essential requirement for any surveillance system is the "ability to communicate". The communication process is a two-way exchange of information which involves the health workers on one side and the population on the other.

When implementing surveillance as a part of a system of health care delivery we have therefore to consider two main aspects:

(a) the existence of a demand for the services;

(b) the practical possibility of delivering the services.

No disease notification system will ever be established if a community has no demand for it, or if such demand does not result in the delivery of a service.

To be accepted by the community, surveillance should provide tangible benefits. The offer of adequate therapy and environmental sanitation services with no element of compulsion are all factors which increase the ability to communicate.

IX ENVIRONMENTAL SANITATION ASPECTS IN THE CONTROL OF DIARRHOEAL DISEASES

The benefits of environmental sanitation in the control of diarrhoeal diseases have been demonstrated by statistics. In point of fact, experience from past efforts to control these diseases has led to the generally accepted conclusion that the only effective and long-lasting solution to the problem is the country-wide provision of safe water supplies and sanitary facilities for excreta disposal, coupled with food sanitation, health education and personal hygiene.

1. Water Supply

For urban communities, the accepted goal is to provide water through piped systems to the households. Water may be derived from underground or surface sources, appropriately treated as required to meet established quality standards. Properly designed and operated systems of this type should deliver safe water in adequate quantities to the premises of use at all times, and should involve no possibility of spreading diarrhoeal diseases. However, many piped systems are, in reality, poorly operated, inadequately maintained and overloaded due to delayed expansion to meet the ever-increasing water demands. In such instances, though the water produced at the treatment plants may still be safe, the chances for post-contamination are high, especially in systems where the supply is intermittent and where household storage (roof tanks etc.) are used due to inadequate supply and inadequate system pressure. Despite these possible shortcomings, epidemiological findings of recent cholera outbreaks in the Region generally ruled out the involvement of piped water supply systems in the transmission of the disease. Nevertheless, inadequate systems should be up-graded as soon as possible.

Based on financial considerations, it is obviously unrealistic to expect that each and every rural community will be provided with piped water supplies and house connections in the foreseeable future. Technically speaking, unless regional systems are used, to provide each village with an individual system involving treatment and/or pumping would create insurmountable operational and maintenance problems. The type of supply as well as the level of service generally considered practical and acceptable for rural communities is still a protected dug well with a handpump or a rope-and-bucket water-drawing arrangement, a tubewell/handpump installation, or a standpost on a piped water supply system. The main emphasis in this approach is to

ensure the safe quality of the water at the source. However, the chances for contamination during transportation from source to household and during home storage are great, and there seems to be no effective means of control other than health education. Further, time and effort are still needed to carry water home for use, and the population involved must be encouraged to carry and use more water to ensure personal cleanliness.

Should the water for any household be unfortunately contaminated, the spread of diarrhoeal diseases would probably be limited to the family concerned, as long as the water is safe at the source. Thus, this simple type of supply does make a useful contribution towards the control of diarrhoeal diseases.

Unprotected water sources such as open dug wells, stepped wells, village ponds, rivers, irrigation canals, etc., are normally contaminated and could serve as vehicles of transmission. Their use for drinking and domestic purposes should be discontinued and they should be replaced with improved sanitary supplies.

2. Human Wastes

Sewerage systems with treatment facilities, if properly designed and installed, should provide sanitary and safe evacuation and disposal of human wastes, and are suitable for use in urban agglomerations where water is available as waste carriage. Where such systems exist, it is important to ensure that the various collection, pumping and treatment facilities are satisfactorily operated and maintained so that they will provide the safe evacuation of liquid wastes for which they are intended. There are cases where sewers alone are constructed and the sewage collected is discharged into a water course or a lake or the sea without treatment of any sort. This will create potential risk zones in the receiving waters which could spread water-borne diseases, especially when there are outbreaks of such infections. The long-term solution to this situation is of course to provide suitable treatment before the liquid waste is discharged and/or to improve the design and construction of outfalls if the effluent is discharged into the sea or a large lake.

In order to conserve water resources, it is logical to consider the re-use of treated sewage effluents for agricultural purposes, especially in arid areas where only scant water is available. However, this bears a potential health hazard and must be practised with extreme care. The use of untreated sewage for the irrigation

of vegetables eaten raw has unfortunately been practised in some parts of the Region and has been proven to be one of the vehicles for the transmission of cholera. This practice should be discontinued.

In rural areas, human excreta can be disposed of in a reasonably safe manner through the use of sanitary latrines so designed as not to contaminate soil and ground or surface water and not to permit access of flies and animals to the excreta. The pit privy, the aqua privy and the water-seal latrine are among those commonly in use in different parts of the world, and it should not be difficult, from a technical viewpoint, for the national health authorities to work out a design suitable for local conditions. The important step is, however, to promote the acceptance and the use of latrines by the rural population and to motivate their participation in the rural sanitation programme.

3. Food Sanitation

In urban situations, foods are prepared by food processors, transported to the community, and distributed by middlemen. Food preservation and long-term storage are also features of the urban, industrialized food chain. Although the urban food chain in developing countries may be simpler and more direct, yet the food control problems there are certain to increase with time and with gradual industrialization.

Complete food control entails careful surveillance of the whole chain of food production, processing, storage, distribution and preparation. Nevertheless, certain food sanitation measures such as surveillance of permanent food establishments and of food handlers, controlling the quality of water and ice used to prepare food and drinks, protecting food from contacts with flies, etc., if properly planned and organized taking into consideration the nature of the problem under local conditions, should prove useful in the control of food-borne enteric diseases. However, the real problem in some developing countries is the existence of small food vendors in large numbers. They may be itinerant or may sell food in the market or in some other places during festivals or fairs, and it is difficult to apply food controls to them. There is also the problem of food contamination resulting from the practice of washing green vegetables while in transit with water which may be polluted. The provision of safe water at supervised points along the route of transportation may help alleviate the hazard.

In rural agricultural societies, home preparation and consumption of locally produced foods is still the general pattern of life. The promotion of improved personal hygienic habits is probably the only measure that is required to ensure food safety in such situations.

If people could be taught to form a habit of washing their hands thoroughly before touching or eating any food, much would have been accomplished in checking the spread of diarrhoeal diseases through food as a vehicle. Education of the people to increase their understanding of the mode of transmission of these diseases and to improve their personal hygiene is therefore a very important undertaking.

4. Vector Control

The house fly is probably the most involved insect vector in the spread of diarrhoeal diseases. Whereas chemical control provides quick results, proper disposal of solid wastes (garbage, etc.) is still the permanent solution to fly control. Suitable solid waste management programmes should therefore be organized by responsible government agencies as part of their sanitation programmes directed at the control of diarrhoeal diseases. Solid wastes management programmes will also have the benefit of reducing the rodent and cockroach populations, which might have marginal involvement in the transmission of diarrhoeal infections.

Environmental sanitation is the key to controlling the diarrhoeal diseases, including cholera. It is accepted that a properly implemented environmental sanitation programme is expensive; nevertheless, its benefits are long-lasting.

In recognition of the need for accelerated development of water supply and sanitation, the United Nations Water Conference held in Argentina in March 1977 recommended the adoption of the target of safe water supply and sanitation for all by 1990 and the designation of 1981-1990 as the International Drinking Water Supply and Sanitation Decade. Both recommendations were adopted by the United Nations General Assembly in 1977.

X HEALTH EDUCATION ASPECTS IN THE CONTROL OF DIARRHOEAL DISEASES

The health education programme and activities have to be a component of the diarrhoeal disease control programme with identified main objectives under which specific obligations can be worked out in relation to identified specific problems, e.g. related to oral rehydration, breast-feeding, cholera notification, etc. A system of continuous as well as periodic evaluation of health education activities should be planned from the start and carried out to enable a proper understanding of results and modification of these activities, if necessary.

Principles, approaches and methods of health education:

(a) Principles

- identify specific health problems needing health education support and socio-cultural constraints;
- proposed activities should be in conformity with socio-cultural beliefs and values of communities;
- creation of community awareness and national will to undertake the programme.

(b) Approaches

- ensuring active participation of communities and individuals;
- enlisting general educational systems whenever necessary (i.e. school health education);
- specific objectives need to be so formulated so as to meet essential criteria of being technically realistic, measurable, economically feasible; target groups needing behavioural change, nature of behavioural change, when and where.

(c) Methods have their advantages and limitations and need to be used in suitable combinations

- mass media of radio, television, films, newspapers, pamphlets, posters, etc.
- large and small groups;
- person-to-person contacts.

Organizational requirements of personnel and facilities will be rather small in countries where health education units at central and provincial levels already exist. In other countries this programme should help stimulate the establishment of health education units.

A main problem is the decline in breast-feeding in relation to diarrhoeal diseases among infants and children.

Another important factor is the coordination of demonstration of various activities, i.e. success of oral rehydration, breast-feeding habits and improvements with training activities and services in field training areas (of sizeable rural and urban populations) existing or to be established in relation to institutions for health personnel training, e.g. medical and nursing schools. Temporary demonstration areas are notorious for being unrealistic, fading away and taking away with them the demonstrated activities.

Health education, to have any credibility, should be in relation to actual programme activities and not in a vacuum.

Field training areas should be used to the extent possible.

Exchange of evaluated health education materials among countries should be encouraged.

XI TREATMENT AND ORAL REHYDRATION ASPECTS IN THE CONTROL OF DIARRHOEAL DISEASES

There are four parts to this subject:

1. Drug treatment
2. Intravenous rehydration
3. Dietary management
4. Oral rehydration

1. Drug treatment

Antibiotics may or may not be useful in individual cases, according to the nature of the infecting organism and whether or not it is resistant to the particula antibiotic. It is in shigella that there may be most use - but even here, the emergence of multiple drug resistance may be a problem in epidemics. Specific treatment is also available for amoebiasis and giardiasis. But for the great majority of cases of acute diarrhoeal disease in infants and young children, which is by far the greatest problem, drug treatment has little place, since the infection will often be self-limiting, there are no antiviral agents, and there is no chance in the village circumstances even to identify the organism or test its sensitivity if it is bacterial.

2. Intravenous rehydration

This should be reserved for the child or adult (in cholera) in state of shock and unable to swallow, or for rare cases of intractable vomiting.

3. Dietary management

Its principles are simple and can be stated thus:

(i) No cessation of breast-feeding.

(ii) No starvation. Let the child drink and eat of his normal food whatever he will accept. In some cases, because of secondary lactose intolerance, it may be necessary to substitute other protein-foods instead of cows' milk, especially dried skim milk, if it becomes apparent that each time this is taken the child has increased diarrhoea. But this is advice for such cases only, not a universal prescription.

(iii) As soon as possible normal feeding should be resumed, and more than this, the child should receive compensatory feeding after the diarrhoea is over. Some advice should be given such as "try to give him as extra all the food he missed in his illness", or "an extra meal a day for as many days as he was ill"

4. Oral rehydration is the one measure which gives us now the opportunity to make a marked reduction in the appalling death-toll from acute diarrhoeal diseases in children under three years of age.

XII PATHOPHYSIOLOGY OF DIARRHOEA

There are two main causes of diarrhoea, namely microbial invasion of the gut and malabsorption of sugars. The former is almost certainly numerically the most important, but the latter deserves consideration also, even when we are dealing with the problem en masse.

The toxin enters the epithelial cells of the small intestine, and stimulates the production of adenyl cyclase, which regulates cyclic AMP. AMP under normal physiological conditions is responsible for secretion of chloride from the epithelial cells through the action of various hormones. When enterotoxins stimulate adenyl cyclase the level of cyclic AMP in the cell rises, which then leads to excess secretion of chloride into the lumen of the gut. This secretion results in the diffusion of other electrolytes and water from the epithelial cells into the gut lumen to maintain

osmotic balance between the cytoplasm of the cell and the gut fluid. The diffusion of water and electrolytes from the epithelial cell to the gut leads also to diffusion of similar components from other parts of the body into the epithelial cells and then again out into the gut lumen. Thus there is a continuous loss of fluid and electrolytes from the patient's body into the gut lumen, and a large amount of watery stools. There is also excessive secretion of mucus from the goblet cells. The effect of the enterotoxin on the epithelial cell is irreversible and persists until the cell through natural growth and movement upwards falls off the tip of the villus into the lumen, a process taking three days in the healthy person. This is why antibiotics treatment cannot stop diarrhoea quickly even if the pathogen is eradicated within a few hours.

The commonest form of saccharide malabsorption is lactose malabsorption, but sucrose malabsorption is also seen in diarrhoea. When the mechanism for absorption of saccharide is not functioning normally, then the saccharide reaches the colon where it is decomposed by the bacteria which are abundant there into organic acids. This results in higher osmolarity of the lumen which in turn leads to the movement of water and electrolytes from the intestinal epithelium, and from the rest of the body, into the lumen. Characteristic of this form of diarrhoea is a stool pH of less than 6 and a high saccharide content.

These saccharide malabsorptions are often developed by patients in the course of a diarrhoeal attack, being thus secondary to infective diarrhoea and temporary.

XIII ORAL REHYDRATION

The prevention and treatment of dehydration are of course the key to saving the lives of these children. Mild and even moderate dehydration, even up to just short of the point where the child starts to become comatose, can be orally rehydrated. Moreover, at the village level with no possibility of electrolyte control, and even at hospital level in some ways oral rehydration is much safer.

For the last three years, UNICEF has been supplying the ingredients of the glucose electrolyte mixture in an aluminium foil package. The cost is about 12 cents each. A number of countries also package the ingredients locally.

To understand why oral rehydration has been found successful both in cholera and in infantile diarrhoea we consider the pathophysiology and the effect of a glucose electrolyte mixture in the lumen of the gut in diarrhoea. Enterotoxins affect the intestinal epithelium and produce an outflow of chloride followed by the other electrolytes and water. However, a remarkable point is that the absorption capacity of the intestinal epithelium is not impaired in diarrhoea.

That means that if by some means the movement of salts from the intestinal fluid into the epithelium could increase, the absorption of water and other electrolytes would be increased and one could achieve rehydration through the epithelium.

Many efforts were made over many years to do this, sometimes with discouraging results. This led to the general belief that oral rehydration was not satisfactory or even impossible. Then in the early 1960s studies on the physiological uptake of sodium by various cells showed that sodium absorption is greater when glucose is added to the sodium solution. Glucose is the important factor, for it increases markedly the absorption of sodium back into the cell with the result that the other electrolytes and water follow. So efficient is this active transport of glucose and sodium that it reverses, in the direction of rehydration, the balance between outflow and absorption of water and electrolytes to and from the lumen.

Cycline would do just the same, but is much too expensive to include in a formula for this kind of mass use. Even glucose is rather expensive and one would like to use sucrose instead, since it will be split into glucose and fructose, but the question is still under study whether sucrose malabsorption would outweigh the advantage of greater cheapness. Even with glucose, malabsorption occurs in about five per cent of cases.

The concentration of glucose recorded here is established by many studies which have led to the conclusion that increasing the concentration beyond 20 grams per litre does not appreciably increase re-absorption, while on the other hand it may overtax the capacity of the gut to absorb it with resulting malabsorption diarrhoea.

XIV RESULTS OF ORAL REHYDRATION TRIALS

To ascertain whether a suggested treatment is better, and in what way and to what degree better, than the treatment as given at present, it is necessary to have a trial with a study group receiving the proposed new treatment and a control group receiving the present treatment (as the present treatment is supposed to be given).

In the instances we are concerned with, i.e. early treatment at the village level, we must therefore have experimental and control groups of villages as similar as possible to each other. In one group, the control, the usual treatment is given, i.e. medicines and specified instruction about making the child drink plenty, not stopping breast-feeding and not starving the child. The study group gets the same medicine and instructions, and also oral rehydration i.e. the mother is shown how to mix the powder, she gives some of it under supervision to the child in the clinic itself, and then is given two packets to take home with the child to last the next 24 hours. Both oral rehydration and control patients must return daily until the end of the episode. They are weighed on every occasion, and are also weighed regularly until at least six months after the episode.

The oral rehydration is evaluated in respect of amount consumed and acceptability, and in comparison with the control in respect of:

1. weight gain or loss during the episode;
2. duration of the episode;
3. necessity for referral to hospital;
4. average monthly weight gain over the six to eighteen months after the episode.

Trials such as those described are being conducted, with WHO collaboration, in some twenty countries in the world, among them Iran and Egypt in our Region. The results are available for the trials conducted in Turkey and in the Philippines, and also in part from that being conducted in Laos.

The consumption of oral fluid per child per day per kg bodyweight, as could be expected, was higher in the children aged 12 - 24 months who are likely to be severely affected but are not receiving much if any breast milk, and are likely to be more severely dehydrated than the three- or four-year old.

It is noteworthy that in the Philippines those children who had two or more episodes of diarrhoea during the study period (85 out of 341) actually took an increasing amount per kg per day, demonstrating that the treatment actually increased in acceptability. In the Philippines, the oral rehydration group gained a mean of 129 grams versus 74 grams in the control, in Laos a gain of 187 grams versus a loss of 170 grams in the control.

In Turkey, in the control villages a significantly higher proportion of children lost weight during the episode than in the oral rehydration villages. There was also a difference in the duration of the illness which was significantly shorter in the oral rehydration group than in the control.

However, in both Philippines and Turkey there was a significantly greater average monthly weight gain at all ages for months after the episode in the oral rehydration than in the control groups. It is difficult to explain why the way in which a child is managed during an episode of diarrhoea should affect his nutritional status not for merely weeks but for months afterwards (seven months in the case of the Philippine study and sixteen in the case of the Turkish one).

It perhaps indicates that diarrhoea is far more important in the aetiology of energy protein malnutrition than had been previously recognized. If one pursues this line of thought perhaps severe malnutrition is much more the result of diarrhoeal disease and other infection than it is the result of inadequate dietary intake. This would explain why marasmus and kwashiorkor can exist even in the presence of abundant cheap and nutritious (but not always clean) food. It would explain also why those projects and programmes which concentrated almost exclusively on increasing quantity and quality of food intake, such as nutrition education projects, high-protein weaning foods, Applied Nutrition Programmes, and Supplementary Feeding projects, seemed to have in the main rather disappointing results.

Oral rehydration is in fact a very simple treatment in itself, and can be carried out by a village level health worker or by assistant nurse/midwife; or instead, and here lies our best hope, by the mother herself.

The treatment of dehydration at an early stage in the village and in the home is then, in effect, preventive of severe dehydration necessitating intravenous therapy or causing death. It is acceptable, and it results in less weight loss during the episode, or even in gain instead of loss. It may shorten the illness, and it certainly

results in markedly better nutritional status afterwards for reasons not at all understood, but constituting in fact an improvement similar in magnitude to that achieved by several months' attendance at a nutrition rehabilitation centre.

If it were widely available and properly implemented at village level, throughout our Region, it would probably result in the saving of a quarter of a million lives a year, or even more. And it would seem to offer us also the opportunity to make a real impact on the prevalence of severe malnutrition in early childhood.

XV RECOMMENDATIONS

The participants to the Meeting, having considered the various aspects of diarrhoeal diseases in the Region,having taken note of the recent advances in the knowledge of the epidemiology of enteric infections and cholera, having recognized the importance of oral rehydration as a basic tool for the reduction of mortality among children due to dehydration, being aware of the need for the dissemination of the recent advances in the diagnosis and treatment of cholera and diarrhoeal diseases, have presented the following recommendations:

1. Member countries should develop, with WHO technical co-operation, national programmes for the control of diarrhoeal diseases, suited to their individual needs.
2. The Regional programme discussed and agreed upon during the meeting for a co-ordinated control of enteric infections should be implemented.
3. For the implementation of the Regional programme of enteric infections control, adequate financing should be provided through voluntary contributions by the Member countries and collaborating Agencies.
4. The countries of the Region should, in consultation with WHO, study the individual requirements and estimate the amount of external assistance required as soon as possible. The cost of the Regional programme, excluding the country programmes, is estimated to be of the order of US $ 350 000 per annum in the initial phase of the programme.
5. For the appropriate dissemination of technical information concerning cholera and diarrhoeal diseases, up-to-date technical guidelines and notes on recent advances in the epidemiology, diagnosis, treatment and prevention of enteric infections including diarrhoeal diseases and cholera should be issued by WHO. National authorities should also issue guidelines on the basis of up-to-date knowledge.

6. WHO should support and encourage the countries of the Region in the establishment of virological laboratories and where already existing, enlarge their scope and capability to clarify the role of virological pathogens as causative agents of enteric infections. Regional reference and collaborating virological laboratories should also be established to assist those countries where such facilities are not yet ready.
7. Close liaison should be established between peripheral and central laboratories, and epidemiological services.
8. Oral rehydration should be introduced at a domiciliary level as the most important component for the treatment and prevention of complications in the case of gastroenteritis among children. For this purpose oral rehydration salts should be made available at primary health care level. In the case of cholera epidemics, active case search should be intensified so that timely oral rehydration can be administered along with appropriate medical care.
9. Most recent advances in the paediatric field which are related to the treatment and management of infantile gastroenteritis, breast-feeding etc. should be communicated to the paediatric profession and disseminated among doctors and nurses, as well as medical and nursing students. WHO should support regional and sub-regional meetings for the dissemination of scientific knowledge among responsible paediatricians and also disseminate training materials and scientific notes as appropriate.

ANNEX I

REGIONAL MEETING ON CHOLERA
AND DIARRHOEAL DISEASES

Alexandria, 1 - 5 June 1978

AGENDA

1. Opening Session
2. Nomination of Officers (Chairman, Vice-Chairmen, Rapporteur)
3. Adoption of the Agenda
4. Review of the problem of diarrhoeal diseases in the Region
5. Review of the present situation in each country: Country reports
6. Epidemiology of diarrhoeal diseases in the Region
7. Control of Epidemics
8. Surveillance for Cholera Prevention and Detection
9. Measures to control diarrhoeal diseases;
   (a) environmental sanitation
   (b) health education
   (c) treatment and oral rehydration
10. Programme for the Control of Enteric Infections in the Eastern Mediterranean Region
11. Special problems
12. Drafting of regional plan on the basis of recommendations
13. Closing session

ANNEX II

REGIONAL MEETING ON CHOLERA
AND DIARRHOEAL DISEASES

Alexandria, 1 - 5 June 1978

LIST OF PARTICIPANTS

EGYPT		Dr A.M. El Akkad Under-Secretary of Health for the Preventive Sector Ministry of Public Health Cairo
IRAN		Dr S. Ourshano Department of Malaria Eradication and Communicable Diseases Control Ministry of Health and Welfare International Health Relations Department Teheran
IRAQ	*	Dr Saadoun Khalifa Al Tikriti Director-General of Preventive Medicine Ministry of Health Baghdad
JORDAN		Dr Sulieman Al Subaihi Director of Preventive Medicine Ministry of Health Amman
KUWAIT	*	Dr Gaafar M. Ezzat Director-General of Preventive Medicine Ministry of Public Health Kuwait
LEBANON	*	Dr Mohamed Mohanna Director-General of Preventive Medicine Ministry of Public Health Beirut
PAKISTAN		Dr (Mrs) Shamim Boukhari Institute of Hygiene Lahore

* Did not attend

SAUDI ARABIA

Dr M. Hashem El Dabbagh
Director-General of Preventive Medicine
Ministry of Public Health
Riyad

SYRIA

* Dr Nouri Ramzi
Vice-Minister of Health
Ministry of Health
Damascus

* Dr Adnan Budeir
Director,
Communicable Diseases Department
Ministry of Health
Damscus

* Dr Adnan Tikreeti
Professor of Bacteriology
Faculty of Medicine
University of Damascus
Damascus

WHO SECRETARIAT

Dr A.h. Taba	Regional Director	Regional Office for the Eastern Mediterranean, Alexandria
Dr M.O. Shoib	Director of Health Services	Regional Office for the Eastern Mediterranean, Alexandria
Dr F. Partow	Public Health Administrator (Communicable Diseases)	Regional Office for the Eastern Mediterranean, Alexandria
Dr V. Parisi	Regional Adviser on Epidemiology, and Secretary to the Meeting	Regional Office for the Eastern Mediterranean, Alexandria
Dr E. Gangarosa	WHO Temporary Adviser	Bacterial Diseases Division, Center for Disease Control, Atlanta, USA
Dr A. Langmuir	WHO Temporary Adviser	Formerly Center for Disease Control, Atlanta, USA and Harvard University, USA
Dr M.H. Wahdan	WHO Temporary Adviser	Vice-Dean, High Institute of Public Health, Alexandria

* Did not attend

WHO SECRETARIAT (cont'd)

Dr Y. Watanabe	*	WHO Temporary Adviser	Adviser for Laboratories, Ministry of Health, Kuwait
Mr Chen Kuo		Regional Adviser, Community Water Supply	Regional Office for the Eastern Mediterranean, Alexandria
Dr M.R. Husseini		Regional Adviser on Health Laboratory Services	Regional Office for the Eastern Mediterranean, Alexandria
Dr R. Cook		Regional Adviser, Maternal and Child Health/ Nutrition	Regional Office for the Eastern Mediterranean, Alexandria
Dr S.A. Zafir		Regional Adviser on Family Health	Regional Office for the Eastern Mediterranean, Alexandria
Mrs C. Cartoudis-Démétrio		Conference Officer	Regional Office for the Eastern Mediterranean, Alexandria
Mrs I. Farid		Secretary	Regional Office for the Eastern Mediterranean, Alexandria

* Did not attend

PROGRAMME FOR CONTROL OF ENTERIC INFECTIONS IN THE EASTERN MEDITERRANEAN REGION (1978 - 1983)
as recommended by the Regional Meeting on Cholera and Diarrhoeal Diseases, Alexandria, 1 - 5 June 1978

GENERAL INTRODUCTION

The Sixth General Programme of Work defines, among others, the following broad objectives for the implementation of disease prevention and control in general :

(1) strengthen national and international epidemiological surveillance of communicable diseases of public health importance, and collaborate with countries in evolving programmes for their control ;

(2) provide prompt and effective assistance in emergencies ;

(3) promote research on measures to prevent and control communicable diseases,

(4) develop and apply means for the control of vectors, intermediate hosts and reservoirs of pathogenic agents.

The Sixth General Programme of Work stated that "the impetus given to cholera control should be extended through prophylactic, therapeutic and environmental health measures to the entire range of acute infections of the intestinal tract" which also represent a major cause of morbidity and mortality, severely affect young children and require a multidisciplinary approach. It further stated among the detailed objectives "to prompt and coordinate the development of research on effective and economical measures for the prevention and control of communicable diseases".

To achieve the objectives set above, this programme envisages the participation of WHO/EMRO in the countries of the Region in (a) establishing the profile of the epidemiological situation and determining the health and socio-economic parameters that justify priority of action; (b) determining the possibility of preventing or controlling the communicable diseases using the most effective and economically most suited methods.

The above broad objectives are fully applicable to the prevention and control of enteric infections as a part of a larger programme of communicable disease control for which a comprehensive medium-term programme shall be prepared in due course.

SITUATION ANALYSIS

The occurrence of enteric infections is ubiquitous in all countries of the Region. Parasitic and bacterial pathogenic agents are recognized through the existing laboratory facilities but identification of viral pathogens is feasible only in very few countries where facilities for virological work exist.

The common determinant of mortality among children with gastroenteritis is dehydration, therefore rehydration if instituted in time, may save the life of the child. Until recently, rehydration treatment was given to patients intravenously. With the development of oral rehydration techniques timely care can be brought to the house of the patient in most remote areas by health workers with simple training

The countries of the Eastern Mediterranean Region are not thought to harbour, according to available evidence, endemic cholera, but are subject every year to the importation of the disease from the endemic foci. The disease first appears around April/May in the most eastern countries of the Region and progressively proceeds towards west to reach its maximum around August/September and disappear towards November/December. A cause for particular concern is the annual gathering of more than a million pilgrims from all parts of the moslem world at a time, which, in the next five years, will coincide with the cholera epidemic season.

There is growing evidence of the relationship of enteric infections including cholera in the Middle East linked with the practice of using sewage mixed with irrigation waters in vegetable gardens. This practice is difficult to correct through educational or legislative measures. On the other hand the implementation of sewage treatment plants is extremely expensive. A cost benefit analysis would be necessary.

The presence of cholera even in sporadic form, has so far brought psychological and socio-economic problems to the affected countries and determined outsized reactions among neighbouring countries. Importation of perishable goods has been banned with consequent economic losses. The health resources of the countries have been drained to cope with the public demand for vaccination despite the knowledge of the poor protection afforded by it.

The knowledge of the epidemiology of enteric infections in general and infant gastroenteritis in particular is incomplete and a system of epidemiological surveillance is necessary. The development of such system would bring timely remedial measures to the most remote areas as soon as outbreaks appear and would help with disseminating practice and knowledge about oral rehydration.

II TARGETS AND ACTIVITIES

The extent of WHO involvement will depend on the priorities fixed at the national and regional levels and on the availability of funds. The general objectives and targets may be achieved in a phased programme of progressive expansion.

The plan therefore envisages targets which may have to be revised in the course of the present programming period (1978 - 1983).

For an appropriate planning and programming, three main pre-requisites have to be satisfied: (a) detailed knowledge of the epidemiology of the enteric infections; (b) expansion of the surveillance mechanism to reach the most remote areas; (c) improvement of the diagnostic capability of the public health laboratories.

The present programme in the area concerned with the control of enteric infections comprises the following:

(a) epidemiological study of enteric infections including cholera at country and regional level for the quantification of needs and the formulation of country and regional plans; (b) broad programming for the establishment of epidemiological information collection and retrieval; (c) broad programming at country level setting objectives and approaches, targets, methods, manpower requirements, physical facilities, activities, and output indicators for evaluation.

The targets defined in this medium-term programme as well as the objectives belong to two orders, the first general targets applicable to activities of the WHO Regional Office, the second specific country targets to be integrated in the health plans of the countries concerned.

Following recommendations of the Regional Committee, the Government of Kuwait has already initiated the financing of the programme with an offer of Kuwaiti Dinars 5 000 and more contributions are expected from other countries as well as from other international agencies such as UNDP and UNICEF.

1. OBJECTIVES AND TARGETS AT REGIONAL LEVEL

Objectives

Collaborate with Governments in the implementation of:

a.1 a system of notification and reporting of enteric infections including cholera in all countries of the Region (Res.1 - RC27A - Technical Session - first and third paragraphs)

a.2 a system of information storage, retrieval and anaysis at national and regional levels (Res.4 - RC27A - Technical Session)

a.3 convening a Regional Group of Experts for the study of enteric infections in the Region and formulate a unified regional plan to prevent the spread of cholera in the Eastern Mediterranean Region (Res.5 - RC27A - Technical Session)

a.4 a system of laboratory standard examinations for diagnosis of enteric infections

a.5 a standard methodology diarrhoeal diseases treatment

a.6 organization of emergency services in case of epidemics

a.7 strengthening existing health education units and activities or establishing new ones in the countries if necessary

a.8 co-ordination of related programmes at regional and country level (Environmental sanitation, MCH, etc.)

a.9 enteric infections control.

TARGETS - ACTIVITIES

TARGET A.1

Compilation of baseline information to assist country planning

Related Activities

A.1.1 Study of the distribution of enteric diseases countrywise and regionwise.

A.1.2 Determination of population groups at risk.

A.1.3 Determination of related socio-economic and environmental factors

A.1.4 Inventory of present and potential resources: human, institutional, material and financial.

A.1.5 Definition of most suitable and economic technologies for:

- surveillance
- diagnosis, clinical and laboratory
- treatment
- prevention
- control

A.1.6 Estimate of costs

A.1.7 Estimate of administrative and operational needs

TARGET A.2

- Assistance to countries in planning of enteric infections control integrated into basic health services in general and primary health care in particular
- Emergency assistance

Related Activities

A.2.1 Visit of Regional Advisers

A.2.2 Provision of short-term consultants and/or long-term advisers

A.2.3 Provision of technical literature and library references related to the subject

A.2.4 Organization of technical meetings, seminars and training courses,

A.2.5 Provision of exchange of technical staff through fellowship programmes (travel, fellowships)

TARGET A.3

Establishment of Regional technical groups made of experts of the Region with national technical assistance.

Related Activities

A.3.1 Call for nomination from most affected countries

A.3.2 Convening of the meetings of the technical groups, establishment of terms of reference and plan of work

A.3.3 Drafting of the plan of work of the technical group

A.3.4 Approval of the plan by Regional Committee.

TARGET A.4

Definition of most suitable laboratory technologies

Drafting and dissemination of related practical manual of laboratory techniques.

Related Activities

A.4.1 Consultations with appropriate technical bodies

A.4.2 Study of practicability at field level

A.4.3 Translation of manuals into Arabic

A.4.4 Workshops on laboratory techniques related to enteric infections

A.4.5 Fellowship programme for laboratory technicians

A.4.6 Organization of national training courses

A.4.7 Designation of collaborating laboratories at regional and international levels.

TARGET A.5

Definition of most suitable diagnostic, treatment and prevention technologies. Drafting and dissemination of manual on diarrhoeal diseases diagnosis, treatment and prevention with particular reference to cholera and infantile diarrhoea.

Related Activities

A.5.1 Consultation with appropriate technical bodies

A.5.2 Studies of practicability at field level

A.5.3 Translation of essential education material into Arabic

A.5.4 Seminars on diagnosis, treatment and prevention of diarrhoeal diseases and surveillance mechanism

A.5.5 Fellowship programme for professional and sub-professional staff with responsibility in diarrhoeal diseases

A.5.6 Organization of national training courses and seminars

TARGET A.6

Organization of emergency services in case of epidemics

Related Activities

A.6.1 Formulation of plan of action

A.6.2 Assignment of responsibilities

A.6.3 Provision of emergency services such as medical care facilities, transport, equipment and supplies

A.6.4 Epidemiological epidemic services

A.6.5 Implementation of inter-epidemic services.

TARGET A.7

Strengthening existing health education units and activities or establishing new ones in the countries if necessary.

Related Activities

A.7.1 Identification of related specific problems both in the areas of health and socio-cultural aspects.

A.7.2 Formulation of the sub-programme for health education related to diarrhoeal diseases.

A.7.3 Co-ordination at central, provincial and peripheral levels in each country and assignment of responsibilities.

A.7.4 Preparation and field testing of suitable materials and their distribution and utilization.

A.7.5 Carrying out related training programmes.

A.7.6 Evaluation to be planned from the start and implemented on a continuous as well as periodic basis.

TARGET A.8

Identification of related programmes at Regional and country levels.

Related Activities

A.8.1 Co-ordinate role of MCH in the prevention of diarrhoeal diseases among children - Sub-programme 3.2.1

A.8.2 Co-ordinate role of EHE in the correction of environment factors favouring transmission of diarrhoeal diseases - Sub-programme 5.1.2

A.8.3 Promote participation of related international agencies i.e. UNICEF, FAO, IBRD, UNDP, UNFPA and bilateral agencies

TARGET A.9

Collaborate with countries in the implementation of enteric infections control; Evaluate efficiency and efficacy of measures applied.

Related Activities

A.9.1 Provide advisory services through Headquarters and Regional Office staff, and short-term consultants, as well as material assistance.

A.9.2 Provide assistance for analysis of statistical returns on morbidity and mortality for diarrhoeal diseases.

A.9.3 Implement comparative study of control measures applied. Cost-benefit analysis.

II. OBJECTIVES AND TARGETS AT COUNTRY LEVEL (GUIDELINES)

Objectives

B.1. Identification of the enteric infections problem.
B.2. Identification of human resources and their adequacy in terms of number and performance.
B.3. Identification of suitable and economic methods of enteric infections control, implementation of training.
B.4. Identification of material and institutional resources and their adequacy in terms of quantity and quality.
B.5. Drafting of plan for enteric infections control, including a properly planned health education component.
B.6. Implement plan for diarrhoeal disease control.

TARGETS, ACTIVITIES

Each country shall attempt to define the time-table of the following targets:

TARGET B.1

Define priorities and draft baseline information for enteric infections control.

Related Activities

B.1.1. Comparative study of health priorities and situation analysis in the enteric infections area.
B.1.2. Implement appropriate epidemiological ad hoc studies.
B.1.3. Pre-investment analysis, comprising study of economic losses due to mortality and morbidity caused by diarrhoeal diseases and economic damage on tourism, trade and productivity due to the presence of enteric infections.
B.1.4. Study on behaviour and attitudes towards enteric infections and related problems.

TARGET B.2

Development of health manpower required for enteric infections control and related research.

Related Activities

B.2.1 Establish health manpower requirements.
B.2.2 Implement training courses, seminars and technical meetings at national level and participate in inter-country meetings.
B.2.3. Promote dissemination of related technical knowledge.

TARGET B.3

Standardize methodologies of enteric infections control applicable to local conditions.

Related Activities

B.3.1 Introduce and evaluate appropriate therapeutic technologies with the appropriate responsible staff. This includes particular emphasis on the use of rehydration techniques.

B.3.2 Introduce and evaluate appropriate laboratory techniques for the selective detection and recognition of causes of enteric infections in particular flowcharts methods of stool examination.

B.3.3 Introduction and evaluation of methods of environmental monitoring (i.e. routine testing and bacteriological examination of water, sewage and food).

TARGET B.4

Define needs in terms of medical care facilities, laboratories and organizational institutions required for implementing enteric infections control.

Related Activities

B.4.1 Inventory of institutional resources at country and regional levels, including MCH services, public health laboratories and hospital care facilities for routine needs and for emergencies.

B.4.2 Inventory of transport and communications available and estimate needs for surveillance services, epidemiological investigations, ambulance services and control operations.

TARGET B.5

Prepare and finalize for implementation a plan for enteric infections control within the limits of available human, material and financial resources, according to local needs and priorities.

Related Activities

B.5.1 Plan and organize a surveillance system including a system of rapid notification and referral of cases.

B.5.2 Plan and organize a network of laboratories at peripheral level capable of rapid diagnosis for early identification of cholera.

B.5.3 Plan and organize a system of rapid assistance for dehydrated cases at their own domicile through village workers and village collaborators. This plan will include rapid referral to specialized institutions in case of severity of clinical symptoms.

B.5.4 Plan and organize a system of environmental control linked to the system of environmental monitoring.

B.5.5 Plan and organize health education activities with specific reference to enteric infections.

B.5.6 Secure financing of all activities from internal and/or external sources.

TARGET B.6

Implement control plan in all its multidisciplinary aspects.

Related Activities

B.6.1 The activities for control from the selected methodologies and policies adopted. These will include:

- a system of surveillance
- a rapid notification system at national and international level
- epidemiological study of outbreaks
- expanded utilization of oral rehydration
- standarddiagnostic methods routinely applied also in cholera inter-epidemic periods.
- standard formulation of intravenous and antibiotic treatment
- environmental control measures
- health education of the public

COST ESTIMATE IN US DOLLARS*

REGIONAL PROGRAMME FOR CONTROL OF ENTERIC INFECTIONS

	1979	1980	1981	1982
TARGET 1	30 000	30 000	30 000	30 000
TARGET 2	115 000	115 000	115 000	115 000
TARGET 3	20 000	20 000	25 000	25 000
TARGET 4	41 000	16 000	41 000	16 000
TARGET 5	36 000	36 000	36 000	36 000
TARGET 6	100 000	100 000	100 000	100 000
TARGET 7	15 000	15 000	15 000	15 000
TARGET 8	-	-	-	-
TARGET 9	10 000	10 000	10 000	10 000
TOTAL	367 000	342 000	372 000	347 000

Grand total for 4 years : $ 1 428 000

* A more detailed breakdown of cost for activities is also available

** The cost of some activities are met by other programmes.